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BIOGEOGRAPHICAL AND ECOLOGICAL ASPECTS OF  
DESERTIFICATION PROCESS IN ARID AND SEMIARID  
ENVIRONMENTS

БИОГЕОГРАФИЧЕСКИЕ И ЭКОЛОГИЧЕСКИЕ АСПЕКТЫ  
ПРОЦЕССА ОПУСТЫНИВАНИЯ В АРИДНЫХ И  
СЕМИАРИДНЫХ РЕГИОНАХ

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**Международное географическое  
общество, биogeографическая  
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**Ереванский государственный  
университет, кафедра физической  
географии**

## **Международная научная конференция**

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# **БИОГЕОГРАФИЧЕСКИЕ И ЭКОЛОГИЧЕСКИЕ АСПЕКТЫ ПРОЦЕССА ОПУСТЫНИВАНИЯ В АРИДНЫХ И СЕМИАРИДНЫХ РЕГИОНАХ**

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### **МАТЕРИАЛЫ КОНФЕРЕНЦИИ ЕРЕВАН, 2000**

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# THE SARMATIAN "ARID" FLORA OF MANGYUS (ARMENIA)

I. G. Gabrielyan , V. A. Manakyan , R. A. Hovsepyan

*Institute of Botany of NAS of RA*

*Yerevan State University, Department of Biology*

One of the most interesting and enigmatic floras of the Neogene of Armenia is situated not far from Yerevan. The Sarmatian (Upper Miocene) deposits in which the plant remains are



discovered (the dense greenish and greenish-gray clays), are situated near the former Mangyus village, in a small ravine of the river Dzorakhbyur.

Way back in 1938 V. V. Bogachev, describing the shales eastwards from the Mangyus, mentioned plant remains – *Planera ungeri* and *Salix sp.*, as well as the fauna – ostracods, *Planorbis*, mass compressions of fishes (*Clupea ventricosa*, *Prolebias mutila*). Since the 1960-s this flora was studied primarily by geologist A. A. Gabrielyan (1964), then by academician A. L. Takhtajan, and Ye. F. Kutuzkina (1969, 1977, 1986), D. B. Arkhangelsky, N. G. Gokhtuny, and later by S. G. Zhilin and the authors.

A large collection of the fossil plants from Mangyus (circa 1100 samples) is now deposited in St. Petersburg, at the Department of Palaeobotany of the Komarov Botanical Institute. The last years we are creating a large collection in Yerevan, too, namely in the Institute of Botany of the National Academy of Sciences.

The first impression from the flora collected near Mangyus is the small leaves and abundance of compressions of fabaceous leaves and fruits: *Podogonium knorrii*, *Lespedeza caucasica*, *Gleditsia allemanica*, *Genista paleotinktoria*, *Colutea sp.*, etc.

Several forms of fossil plants from Mangyus display doubtless affinity with the plants composing a characteristic Mediterranean plant assemblage – maquis (evergreen shrubwoods): *Pistacia lentiscus*, *Rhamnus alaternus*, *Ilex aquifolium* and others. The latter is developed in the underbrush, as well as in the disforested slopes (Rickli, 1948; Walter, 1976), tolerates the summer drought, and sometimes is a maquis component.

In the Later Sarmatian times brushwoods were widespread here, occurring in more or less dry habitats, with plant assemblages of the steppe character, as well as river side vegetation (tugaj) with abundant in the fossil Mangyus flora poplar-species from the group *Euphraticae* (*Populus praediversifolia*, *P. takhtajanii*), *Tamarix kryshstofovichii*, *Elaeagnus sp.* and others.

This forms indicate rather arid climate of this territory, although they grow on soils with high moisture and usually high salinity (because of proximity of water body or subsoil waters).

The impressions of the *Populus praediversifolia* leaves display a great similarity to the leaves of modern *P. diversifolia* growing on the sands and sandy soils, predominately along the rivers and lakes, solitary or in boscages. In palaeofloras the fossils of *Tamarix*'s branches occur very rare. *Tamarix kryshstofovichii*, found in Mangyus, is very similar to modern-date *T. ramosissima*, distributed in Balkan region and West Asia, and also to modern-date species *T. chinensis* occurring in the arid areas of China.

We are going to describe some new (for science) species from Mangyus – *Populus takhtajanii* and *Acer zhilinii*. *Populus takhtajanii*, as well as *Populus praediversifolia*, is close relative of *Euphrate* poplars, the most drought-resistant poplar group. *Acer zhilinii* is probably an



ancestor or a relative of modern tatar maple (*Acer tataricum*). Due to a large amplitude of adaptability of tatar maple range to the continental climate conditions, we find this species preserved in that regions whence less xerofitic ranges of this genus, followed the same path, are supplanted longtime ago.

The fossil moss from Mangyus is of a great interest. This find belongs to *Pottiaceae* family, probably to *Barbula* genus. The species of this family are distributed mainly in the countries with arid climate.

The species of fossil plants from Mangyus locality have affinities to the species now common in the Southern Caucasus, westwards from the Armenian Highland, in the Mediterranean region (mainly) and partly to the east – on the mountain edges of the Central Asia, the north of Himalayas and in the middle and northern latitudes in China. This possibly testifies to the fact that due to the regression of the ancient Mediterranean sea a turbulent speciation had place on the territories free from the sea waters, mainly in the conditions of the continental arid (may be subtropical) climate. As a result of further westwards sea regression, new xeric species intensively spread on the new released areas to the west and north-west of their initial area, as well as to the east and south-east.

The above indicates rather dry and warm climate in Upper Miocene in the central part of the territory of Armenia. This climate with probably long and dry summer and short, soft and may be humid winter is rather similar to the climate of the most arid regions of Mediterranean area.

## САРМАТСКАЯ “АРИДНАЯ” ФЛОРА МАНГЮСА (АРМЕНИЯ)

Габриелян И.Г., Манамян В.А., Овсепян Р.А.

Институт ботаники НАН РА

Ереванский Государственный университет, Биологический факультет

На основании находок отпечатков листьев и плодов из сарматских (верхний миоцен) отложений в окрестностях бывшего села Мангюс в центральной части Армении реконструируется климат данного периода. В позднем сармате здесь существовал достаточно сухой и теплый климат, по-видимому, с длинным сухим летом и короткой, мягкой, может быть и влажной зимой, во многом сходный с таковым наиболее засушливых областей Средиземноморской области.